# APPENDIX A

## GUIDE FOR QUALITY CONTROL AND ACCEPTANCE REQUIREMENTS FOR HMA

### 1. Purpose

The purpose of this appendix is to establish minimum requirements for the Contractor's quality control system and KDOT's QC/QA Plan. It is intended that these requirements be used as a procedural guide in detailing the inspection, sampling and testing deemed necessary to maintain compliance with the specification requirements.

### 2. Scope

This procedure is applicable to the production and construction of HMA.

### 3. Requirements

**3.1 General** As stated in the specifications, a Quality Control Plan must be developed by the producer and submitted in writing to the Engineer at the pre-construction conference. Acceptance of the Quality Control Plan by the Engineer will be contingent upon its concurrence with these guidelines. For this reason, the plan should clearly describe the methods by which the quality control program will be conducted. For example, the items to be controlled, tests to be performed, testing frequencies, sampling locations and techniques all should be included and each item should be listed separately. Also include a table stating what actions will occur when test results indicate specification limits are approached or exceeded. See Table 1 at end of this Appendix for an example. Also, a detailed plan of action regarding disposition of non-specification material shall be included. Such a plan shall provide for immediate notification of all parties involved in the event nonconforming situations are detected. Example A-1 HMA Quality Control Plan may be used as an example for a Quality Control Plan.

Inspection and testing records shall be maintained, kept current, and made available for review by KDOT personnel throughout the life of the Contract. All other documentation, such as date of inspections, tests performed, temperature measurements, and accuracy, calibration or re-calibration checks performed on production of testing equipment shall be recorded.

The Contractor shall maintain standard equipment and qualified personnel in accordance with Contract and specification requirements for the item(s) being produced.

**3.2 Quality Control Plan:** Operation Quality Control Plans shall be submitted for each Project to the District Engineer where the Project is located. Distribution of the approved Quality Control Plans will be made by the Engineer.

### 4. Acceptance Sampling and Testing

KDOT is responsible for sampling, testing, and determining the acceptability of the material produced, except for furnishing of necessary materials for testing. Acceptance of the material is based on the inspection of the construction, monitoring of the Contractor's quality control program, verification test results, and the comparison of the verification test results to the quality control test results. The Engineer may use the results of the Quality Control Plan as part of the acceptance procedures, providing:

1) The Engineer's inspection and monitoring activities indicate that the Contractor is following the approved Quality Control Plan; and

2) The results from the Contractors quality control sampling and testing compare with the verification tests.

KDOT's test results will be used on a comparative basis as part of their overall verification program, it shall be done at the frequency listed in the Sampling and Testing Frequency Chart. Some of the verification sampling and testing will be conducted independently from the Contractor's activities, including test equipment.

Unless split samples are used, results from verification tests will be evaluated in accordance with KDOT specifications. If a dissimilarity is detected, an investigation shall be immediately initiated to determine the cause of the dissimilarity.

# EXAMPLE A-1

## HMA Quality Control Plan

To: (DISTRICT ENGINEER)

From: (CONTRACTOR(s) NAME)

Subject: HMA Quality Control Plan.

1. We are submitting our HMA Quality Control Plan, developed in accordance with the Contractor's Quality Control Plan for:

Project No.:
Contract No.:

2. Plant Information:

2.1 General Information:
Make:_____
Type:_____
Location of Plant:_____

2.2 Current calibration and verification status of plant and history of plant inspection program attached.

3. Lab Personnel:

3.1. The quality control program is under the direction of(NAME OF PERSON) who can be contacted at (ADDRESS AND TELEPHONE).

3.2. Sampling and testing will be the responsibility of (NAME OF PERSON(s)), HMA technician number (CERTIFICATE NUMBER(s)).

3.3. Mix Designs will be the responsibility of (NAME OF PERSON(s)), HMA design technician number (CERTIFICATE NUMBER(s)).

4. Field Personnel:

4.1. The field operation is under the direction of (NAME) who can be contacted at (ADDRESS AND TELEPHONE).

4.2. (NAME) will be responsible for insuring that all items of work will comply with KDOT Specifications.

# EXAMPLE A-1 (Cont.)

## HMA Quality Control Plan

4.3. During the placement operations of the HMA pavement we will perform at a minimum quality control tests per attached schedule. Sampling and testing will be the responsibility of (NAME(s)), certification number (CERTIFICATE NUMBER(s)).

5. The HMA design(s) to be used are:
(MIX DESIGN DESIGNATION)

6. Prior to production, (NAME),(CERTIFICATE NUMBER), will submit our HMA Design for each type of mix in accordance with specifications by (DATE). Only approved materials will be incorporated in the mix.

7. During the production operations of the HMA (NAMES) will perform, at a minimum, quality control tests in accordance with the attached schedule. Also attached are the proposed method to select random locations for sampling.

8. All testing and evaluation will be completed by (NAME) within (HOURS) hours of sampling and all documentation will be completed and submitted to the Engineer on approved processing forms within (HOURS) hours according to specifications or production will be halted until these items are current. Example forms are attached.

9. Any material found to be noncomplying shall be addressed by (NAME) who will notify the Engineer immediately.

10. (NAME) will notify all appropriate KDOT personnel at least 24 hours before the scheduled work is to begin.

11. (STATE THE PROCESS FOR DISPOSITION OF NONCONFORMING MATERIAL)

## Table 1: Example of QC Actions to Implement When Approaching or Exceeding Specification Limits

| Test Description | Test Method | Specification | | Situation | | Action |
|---|---|---|---|---|---|---|
| | | Single Test | 4-Point Moving Avg. or Daily Avg. | Single Test | 4-Point Moving Avg. or Daily Avg. | |
| Binder Content | KT-57 | +/-0.6 | +/-0.3 | Approaching limit | Approaching Limit | Discuss with hot mix plant, operator, and may suspend construction process |
| Aggregate Gradation | KT-2 | NA | JMF | 4 point on +#4<br>2 points on -#4 | Approaching Limit | Increase frequency of tests and prepare for process modification |
| Air Voids @ $N_{des}$ | KT-58 | +/-2% | NA | 2 tests over +/-1% | NA | Initiate JMF Modifications |
| VMA | 5.17.04 | <=1% min. | >=min. | 3 tests over +/-1% | >=min.<br><=max. | Discuss with the Engineer & Process Modification |
| VFA | 5.17.04 | NA | >=min.<br><=max. | Over Limit once | Approaching Limit | Notify the Engineer, modify JMF |
| Density @ $N_{ini}$ and $N_{max}$ | KT-58 | NA | >=min. | Approaching Limit Over once | Approaching Limit | Notify the Engineer, modify process |
| Coarse Aggregate Angularity | KT-31 | >=min. | NA | Approaching limit | NA | Modify JMF or Redesign |
| Fine Aggregate Angularity | KT-50 | >=min. | NA | Approaching limit | NA | Notify the Engineer, modify JMF |
| Sand Equivalent | KT-55 | >=min. | NA | Approaching limit | NA | Notify the Engineer, modify JMF |
| TSR | KT-56 | >=min. | NA | Approaching limit | NA | Discuss with the Engineer & initiate investigation, modification, or redesign |
| Dust to Binder Ratio | | NA | >=min.<br><=max. | Approaching limit | Approaching Limit | Modify JMF |
| Flat & Elongated | KT-59 | >=min. | NA | Approaching limit | NA | Modify JMF or Redesign |
| Roadway Density | KT-32 | NA | >=min. | Approaching <91% | <= 100% Pay | Notify the Engineer & Construction Manager |

NOTE: Whenever two consecutive test results fail or if any of the four point moving average values fail, production will be suspended and the situation discussed with the Engineer and Construction Manager. The process will be corrected before production resumes.